STATE OF WASHINGTON

STATE BUILDING CODE COUNCIL

Washington State Energy Code Development

Standard Energy Code Proposal Form

Jan 2022

Log No. 21-GP3-023

Code being amended: ☒ Commercial Provisions ☐ Residential Provisions

Code Section # C404.2.2

Brief Description:

To remove preemption conflicts based on appliance energy source.

Proposed code change text: (Copy the existing text from the Integrated Draft, linked above, and then use underline for new text and ~~strikeout~~ for text to be deleted.)

~~**C404.2.1 Service water heating system type.** Service hot water shall be provided by an electric air-source heat pump water heating (HPWH) system meeting the requirements of this section. Supplemental service water heating equipment is permitted to use electric resistance or fossil fuel in compliance with Section C404.2.1.4.~~

~~EXCEPTIONS:~~

~~1. 24 kW plus 0.1 watts per square foot of building area of electric resistance service water heating capacity is allowed per building.~~

~~2. Solar thermal, wastewater heat recovery, other approved waste heat recovery, ground source heat pumps, water-source heat pump systems utilizing waste heat, and combinations thereof, are permitted to offset all or any portion of the required HPWH capacity where such systems comply with this code and the Uniform Plumbing Code.~~

~~3. Systems that comply with the Northwest Energy Efficiency Alliance (NEEA) Commercial Electric Advanced Water Heating Specification.~~

~~4. Service hot water systems served by a district energy system that serves multiple buildings and that was in service before the effective date of this code.~~

~~5. Commercial dishwashers, commercial food service equipment, and other approved process equipment are permitted to utilize electric booster heaters for supply water temperatures 120°F (49°C) or higher.~~

~~6. Systems connected to a low-carbon district energy exchange system or a low-carbon district heating and cooling or heating only system.~~

~~7. Essential facilities. Groups I-2 and I-3 occupancies that by regulation are required to have in place redundant emergency backup systems.~~

~~**C404.2.1.1 Primary heat pump system sizing**. The system shall include a primary service output of 50 percent load at 40°F (4°C) dry bulb or wet bulb outdoor air temperature for air-source heat pumps, or 44°F (7°C) ground temperature for ground-source heat pumps that provides sufficient hot water as calculated using the equipment manufacturer's selection criteria or another approved methodology. Electric air source heat pumps shall be sized to deliver no less than 25 percent of the calculated demand for hot water production during the peak demand period when entering dry bulb or wet bulb outdoor air temperature of 24°F (-4°C). The remaining primary service output may be met by fossil fuel, electric resistance, or heat pump water heating systems.~~

~~EXCEPTION: Twenty-five percent sizing at entering dry bulb or wet bulb air temperature of 24°F (-4°C) is not required for air-source heat pumps located in a below-grade enclosed parking structure or other ventilated and unconditioned space that is not anticipated to fall below 40°F (4°C) at any time.C404.2.1.2 Primary hot water storage sizing. The system shall provide sufficient hot water to satisfy peak demand period requirements.~~

~~**C404.2.1.3 System design**. The service water heating system shall be configured to conform to one of the following provisions:1. For single-pass heat pump water heaters, temperature maintenance heating provided for reheating return water from the building's heated water circulation system shall be physically decoupled from the primary service water heating system storage tank(s) in a manner that prevents destratification of the primary system storage tanks. Temperature maintenance heating is permitted to be provided by electric resistance, fossil fuel, or a separate dedicated heat pump system.2. For multi-pass heat pump water heaters, recirculated temperature maintenance water is permitted to be returned to the primary water storage tanks for reheating.3. For unitary heat pump water heaters, located in conditioned space, are permitted, where they are sized to meet all calculated service water heating demand using the heat pump compressor, and not supplementary heat.~~

~~**C404.2.1.3.1 Mixing valve**. A thermostatic mixing valve capable of supplying hot water to the building at the user temperature setpoint shall be provided, in compliance with requirements of the Uniform Plumbing Code and the HPWH manufacturer's installation guidelines. The mixing valve shall be sized and rated to deliver tempered water in a range from the minimum flow of the temperature maintenance recirculation system up to the maximum demand for the fixtures served.~~

C404.2.1 High input-rated service water heating systems for other than Group R-1 and R-2 occupancies. In new buildings where the combined input rating of the water-heating equipment installed in a building is equal to or greater than 1,000,000 Btu/h (293 kW), the combined input-capacity-weighted-average efficiency of water-heating equipment shall be no less than the following for each water heating fuel source:
1. Electric: A rated COP of not less than 2.0. For air-source heat pump equipment, the COP rating will be reported at the design leaving heat pump water temperature with an entering air temperature of 60°F (15.6°C) or less.
2. Fossil Fuel: A rated Et of not less than 90 percent as determined by the applicable test procedure in Table C404.2.
EXCEPTIONS:
1. Where not less than 25 percent of the annual service water-heating requirement is provided from any of the following sources:
1.1. Renewable energy generated on-site that is not being used to satisfy another requirement of this code; or
1.2. Site-recovered energy that is not being used to satisfy other requirements of this code.
2. Redundant equipment intended to only operate during equipment failure or periods of extended maintenance.
3. Electric resistance heated systems installed as part of an alteration where the water heating equipment is installed at the grade level in a building with a height of four stories or greater.
4. Hot water heat exchangers used to provide service water heating from a district utility (steam, heating hot water).
5. Water heaters provided as an integral part of equipment intended to only heat or boost the heat of water used by that equipment.
6. For electric heat systems, supplemental water heaters not meeting these criteria that function as auxiliary heating only when the outdoor temperature is below 32°F (0°C) or when a defrost cycle is required are not required to have a rated COP of 2.0. Such systems shall be sized and configured to lock out electric resistance or fossil fuel heating from operation when the outdoor temperature is above 32°F (0°C) unless the system is in defrost operation.

C404.2.2 High input-rated service water heating system for Group R-1 and R-2 occupancies. In new buildings with over 1,000,000 Btu/h in-stalled service water heating capacity serving Group R-1 and R-2 occupancies, at least 25 percent of annual water heating energy shall be provided from any combination of the following water heating sources:
1. Renewable energy generated on-site that is not being used to satisfy other requirements of this code; or
2. Site-recovered energy that is not being used to satisfy other requirements of this code.
EXCEPTION: Compliance with this section is not required if the combined input-capacity-weighted average equipment rating for each service water heating fuel source type is not less than the following:
1. Electric Resistance: An electric resistance water heater with a rating of 105 percent of the rated efficiency of Table C404.2.
2. Electric Heat Pump (10 C.F.R. Part 430): A heat pump water heater rated in accordance with 10 C.F.R. Part 430 with a rating of 105 percent of the rated efficiency of Table C404.2.

3. Electric Heat Pump (not listed in accordance with 10 C.F.R. Part 430): A heat pump water heater not rated in accordance with 10 C.F.R. Part 430 shall have a COP of not less than 2.0. For air-source heat pump equipment the COP rating will be reported at the design leaving heat pump water temperature with an entering air temperature of 60°F (15.6°C) or less. Supplemental water heaters not meeting the above criteria that function as auxiliary heating only when the outdoor temperature is below 32°F (0°C) or when a defrost cycle is required are not required to have a rated COP of 2.0. Such systems shall be sized and configured to lock out electric resistance or fossil fuel heating from operation when the outdoor temperature is above 32°F (0°C) unless the system is in defrost operation.
4. Fossil Fuels: A rated Et of not less than 90 percent as determined by the applicable test procedures in Table C404.2.
5. Hot water heat exchangers used to provide service water heating from a district utility (steam, heating hot water).

C404.2.3~~1.4~~ Supplemental water heating.
C404.2.4~~1.5~~ System fault detection.

Purpose of code change:

Current Code Section (404.2.2) excludes EPCA covered appliances that use gas-fired and electric resistance for water heating. Proposed new code language is from the previous 2018 code cycle which allows for high efficiency gas-fired water heating appliances.

Your amendment must meet one of the following criteria. Select at least one:

- ☐ Addresses a critical life/safety need.
- ☐ The amendment clarifies the intent or application of the code.
- ☐ Addresses a specific state policy or statute. (Note that energy conservation is a state policy)
- ☒ Consistency with state or federal regulations.
- ☐ Addresses a unique character of the state.
- ☐ Corrects errors and omissions.

Check the building types that would be impacted by your code change:

- ☐ Single family/duplex/townhome
- ☒ Multi-family 1 – 3 stories
- ☒ Multi-family 4 + stories
- ☒ Commercial / Retail
- ☒ Institutional
- ☐ Industrial

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Economic Impact Data Sheet

Is there an economic impact: ☒ Yes ☐ No

Briefly summarize your proposal's primary economic impacts and benefits to building owners, tenants, and businesses. If you answered "No" above, explain your reasoning.

Provides more appliance choices for designers and builders to select equipment that best fits the needs of the specific building type and use to provide a more affordable installation cost and long-term operational costs.

Provide your best estimate of the **construction cost** (or cost savings) of your code change proposal? (See OFM Life Cycle Cost **Analysis tool** and **Instructions;** use these **Inputs**. **Webinars on the tool can be found Here and Here**)

$Click here to enter text./square foot (For residential projects, also provide $Click here to enter text./ dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages

Costs will vary widely depending on the application. There is insufficient time to generate these calculations

Provide your best estimate of the **annual energy savings** (or additional energy use) for your code change proposal?

Click here to enter text.KWH/ square foot (or) Click here to enter text.KBTU/ square foot

(For residential projects, also provide Click here to enter text.KWH/KBTU / dwelling unit)

Show calculations here, and list sources for energy savings estimates, or attach backup data pages

Given requirements for Additional Energy Credits, energy savings should be similar to the 2021 WSEC-C.

List any **code enforcement** time for additional plan review or inspections that your proposal will require, in hours per permit application:

Small Business Impact. Describe economic impacts to small businesses:

This should reduce economic impacts to small businesses.

Housing Affordability. Describe economic impacts on housing affordability:

This should reduce economic impacts on housing affordability.

Other. Describe other qualitative cost and benefits to owners, to occupants, to the public, to the environment, and to other stakeholders that have not yet been discussed: